



5. PRICING MOBILE

5.1 Price evolution

Mobile service is rarely cheaper than fixed-line telephony.¹ Even in countries where the service is relatively mature, the price of using a mobilephone to make a particular call is generally more expensive than using a fixed-line telephone. However, higher prices appear to have done little to detract from the popularity of mobile service. Indeed, many users make calls on their mobilephone even when they are at home or in the office and could easily make the same call, more cheaply, on a fixed-line telephone. The secret of the attractiveness of mobile pricing can be summed up in one word: *options*.

It would be inaccurate to say that tariff options were “invented” by the mobile sector. In established competitive environments for long distance such as the United States, customers were bombarded by special options and tariff plans long before mobile service was established. But for most countries, the first experience of telecommunications competition came with the introduction of a mobile operator, either in direct competition with the mobile subsidiary of an incumbent operator, or in indirect competition with its fixed-line operations. With competition comes the need for a service provider to differentiate itself from its rivals, to segment the market, to target specific niches and to market different price options and discounts to customers. Before the advent of competition, many operators did not even have a marketing department, and tariff-setting was a simple matter of adjusting age-old price structures to reflect the effects of inflation. Thus, much of the diversity of today’s tariff options (see, for instance, Tables 5.1 and 5.2) was either introduced for the first time by

mobile operators, or was developed by fixed-line operators in response to the threat of competition from mobile operators.

It is possible to trace the evolution of pricing strategies in more mature mobile markets. Countries which are new to mobile may start at the early stages of this evolution or jump straight to the later stages, depending on the degree of competition and level of demand in the local market:

- In the **early stages** of market evolution (e.g., early adopters of analogue mobilephones in the mid-1980s), the focus of marketing strategies was on the business user segment. Thus, connection and subscription fees tended to be high. Price strategies were designed to ration the available spectrum capacity, for instance by charging higher prices for use in metropolitan areas. Tariff structures tended to reflect the underlying structures of the fixed-line network (e.g., similar long-distance bands as the fixed-line incumbent, standard prices for international calls plus a premium for calling from a mobile).
- In the stages of **take-up** (e.g., analogue mobilephones in the 800-900 MHz bands, in the late 1980s), the focus was extended to cover a wider range of business users (e.g., mobile professionals, self-employed, salespeople) as well as wealthier consumers. During this phase, demand for service was particularly high and the number of suppliers still limited (typically a maximum of two operators in the same geographic region), so there was no

real incentive for operators to cut prices. Tariff structures were similar to those of the first stage but with greater differentiation from fixed-line tariffs. For instance, mobile tariffs which were distance insensitive at the national level were introduced in many European countries. The fact that mobile operators in Europe were generally given nationwide licences helped to make this possible.

- In the early stages of **residential market penetration** (e.g., a mix of advanced analogue and early digital mobilephones, in the early 1990s), the process of technological change enabled service suppliers to offer more differentiated tariffs, offering a digital service as an upgrade to the existing subscriber base (for instance, emphasizing qualities such as secure transmission, higher sound quality, messaging features) while selling the more basic analogue service to an expanded consumer market (emphasizing applications, rather than features, such as the ability to make emergency calls while on the road, to receive calls and better geographical coverage). During this period, the first consumer-
- In the stages of **mass market penetration** (e.g., following the introduction of PCS licences in the mid 1990s), tariff plans and discriminatory pricing have become the norm rather than the exception. Thus service providers have developed endless variations on the same themes of flexible talk plans geared towards ever smaller niche groups of users. Pricing strategies are now more scientific than ever before, based on extensive market research, use of focus groups and detailed study of usage patterns. The more mature markets now have multiple players, so the emphasis is on differentiating one company's tariffs from those of its rivals, for instance by offering "headline" rates (for instance, Orange's "Everyday 50" which offers

Table 5.1: It's good to talk

A sample of "talk plans" (tariff options) available from Orange in the United Kingdom

<i>Plan name</i>	<i>Monthly charge for single phone</i>	<i>Maximum number of phones allowed on talk plan</i>	<i>Standard talk time included (per month)</i>	<i>Peak time standard call charges (per minute)</i>	<i>Peak time Orange to Orange call charges (per minute)</i>	<i>Off-peak standard and Orange to Orange call charges (per minute)</i>
Chat 60	£17.63	1	60 off-peak minutes	40p	12p	5p
Talk 30	£17.50	1	30 minutes	30p	15p	5p
Talk 120	£25.00	2	120 minutes	24p	12p	5p
Talk 400	£58.75	5	400 minutes	22p	11p	5p
Talk 1300	£176.25	15	1'300 minutes	17p	9p	5p
Talk 3700	£470.00	35	3'700 minutes	15p	8p	5p
Talk 7500	£940.00	100	7'500 minutes	15p	8p	5p
Everyday 50	50p/day	1	50 minutes/day	40p	40p	1p (off-peak standard calls). 5p (off-peak Orange to Orange calls)

Notes: For each of the Talk Plans listed, a one-off connection charge of £35 for the first handset is payable. The tariffs were valid at 16 August 1999. At that date, the exchange conversion was £1 = US\$1.61. All prices include VAT. Peak times are from 7.00am to 7.00pm Monday to Friday. Off-peak is at all other times including Bank Holidays. Standard rated calls include most UK national calls, but exclude those to other mobile or premium rate services.

In addition to the Talk Plans listed, other options are available for pre-paid access such as "Just Talk" (25p per minute) and "Boxed and Ready" (free talk time bundled in with price of handset).

Source: Orange, at <<http://www.uk.orange.net/kit/index.html>>.

Table 5.2: Tariff diversity

A selection of mobile cellular pricing options

<i>Price element</i>	<i>Description</i>	<i>Example</i>
Connection	Some operators charge a fee for connecting to their network although the trend is increasingly to waive this charge. Operators of digital (e.g., GSM) services typically charge for the Subscriber Identity Module (SIM) card which provides a user profile and number. Operators may also levy deposits for making international calls or roaming.	Globe (Philippines) waives the connection charge for higher-priced subscriptions. Econet (Zimbabwe) charges both a connection and SIM card charge for new subscriptions. International calling or roaming is not available with Swisscom's (Switzerland) entry level pre-paid scheme but is available with other packages.
Subscription	Most operators generally charge a monthly subscription charge. This may or may not include a certain amount of free minutes. Some operators offer a certain discount per month in lieu of free minutes. There is generally no subscription charge with <i>pre-paid</i> cards. Some operators do charge a "network access" charge with pre-paid. Also, the validity period of the pre-paid card can make it akin to a subscription charge.	MTN (South Africa) offers four main pre-paid schemes: two of them offer any-time calling (120 or 600 minutes); the other two offer weekend only or a mix of weekday and weekend calling. With Orange's (UK) "Just talk" plan, users can continue to receive calls for up to three months even if credit for outgoing calls has expired.
Call charges	Call charges are usually based on a per minute tariff, though per-second call metering is also available from some operators. Some operators charge one rate for the first 30 seconds and a lower rate for subsequent talk-time thereafter. As noted, some operators offer subscription plans that include a certain number of free minutes. A variety of different call rates may be levied, for instance for calls made at different times of day/week, for calls to fixed-line subscribers, calls to subscribers on other mobile networks and to subscribers on the same network. Calls to certain pre-defined numbers may be discounted. Some operators charge for incoming calls. Some operators charge a single national long-distance tariff while others charge distance-dependent tariffs. Operators typically tag-on a surcharge for international calls.	Bell Mobility (Canada) offers per-second billing in its <i>RealTime</i> talk plans. Telstra MobileNet (Australia) charges a minimum (flag fall) charge of 15 Australian cents per call and call charges which range between A\$1.20 per minute (peak rate calls on pre-paid schemes) to 5 cents (79 to 3 US cents) per minute (calls to other Telstra mobiles). SK Telecom (Rep. of Korea) charges peak rates between the hours of 08.00-21.00 and discount rates at other hours and on Sundays. DiAx's (Switzerland) tariffs offer calling throughout the country at a single per-minute price and also short message services for a flat rate, per message fee. International calls are charged at the same rates as DiAx's fixed-line subscribers.
Value-added services	Most operators include a number of standard features with the subscription (assuming the handset can support them). These include caller ID, call forwarding, call barring, call waiting, and call holding. SMS (Short Message Service) and Voice mail are usually charged extra.	CellularOne (US) will soon offer an online billing service via the Internet. Bell Atlantic Mobile (US) offers voice-activated dialing for a flat monthly fee.

Source: ITU, PTO websites.

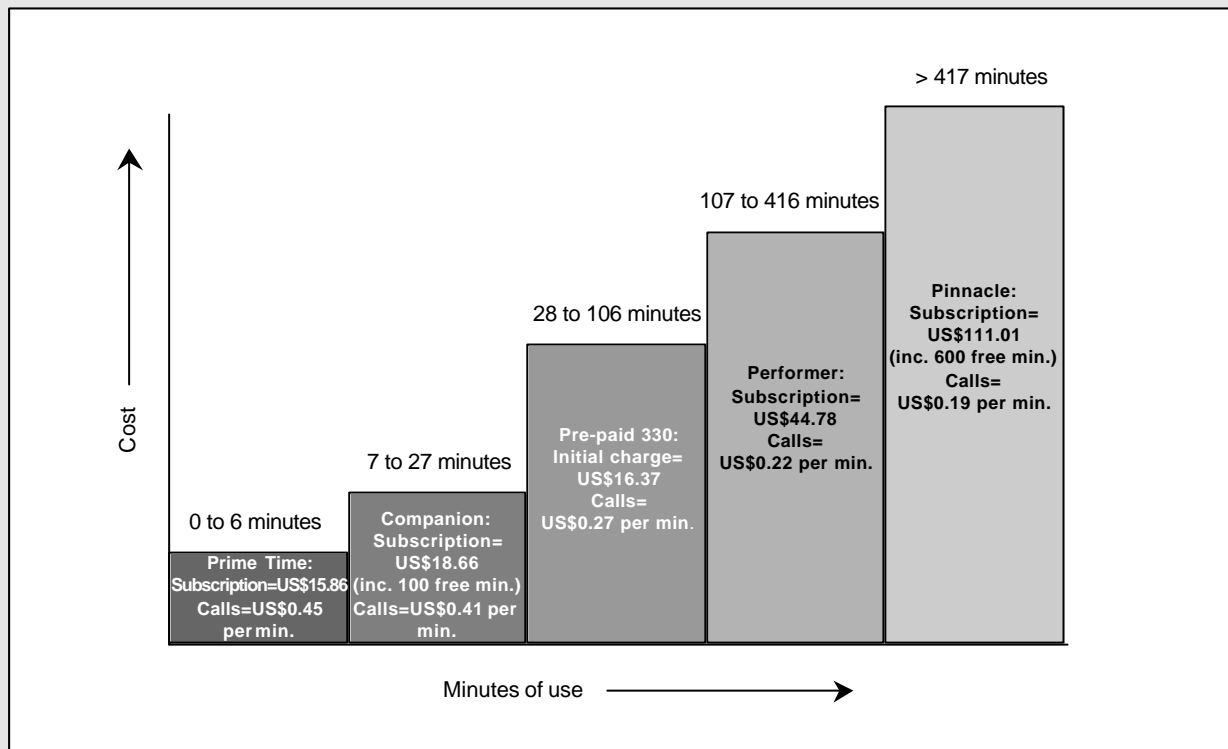
50 minutes of off-peak use per day for 50 pence, about 80 US cents), loyalty schemes, (such as the chance to earn frequent flyer miles with SwissCom) or special offers (such as a chance to win a trip to the Olympics offered by Telstra of Australia).

- In the stage of **commoditization** into which we are now entering in the late 1990s, the emphasis is on expanding the market by reaching those who are

late adopters, such as the very young, the very old, the poor or the technophobic. The characteristic tariff offerings are pre-paid schemes (see discussion in chapter four) which are designed to draw users into the service who can later be weaned on to subscription-based tariff plans. Oddly, the actual tariffs on offer may be quite high, but it is the bundling of the service (for instance, a handset plus a certain number of minutes of free use) or the

Figure 5.1: Breakpoints

Examples of the lowest tariff package on offer from MTN of South Africa for different levels of monthly usage



Note: The chart shows which packages are cheapest for the specific number of minutes of use. The axes are not to scale. The “Companion” package offers 15 free weekday minutes and 85 free weekend minutes included in the monthly subscription. It is assumed that this corresponds with the user’s needs. Other packages on offer from MTN include “Business Plan”, “Pulse”, and “Corporate Time”. The tariffs were valid on 26 August 1999. The exchange rate on that day was US\$1=R.6.11.

Source: ITU, based on tariff data published by MTN at: <<http://www.mtn.co.za/packages/compare.htm>>.

ability to control expenditures (for instance, by purchasing pre-paid cards of a certain fixed amount) which proves attractive. In this phase of market evolution, tariff details tend to get buried in the small print. In the same way that supermarket shoppers rarely study the ingredients of the products they buy off the shelf, so too consumers, who are likely to pick up “packaged” mobile products in supermarkets or gas stations, may not look beyond the initial charge being levied. Unwary customers are often caught out, for instance by charges incurred when roaming or for making calls which exceed those covered by their call plan.

5.2 Price comparisons

The complexity of mobile tariffs makes it difficult to make comparisons between operators and between countries. This lack of transparency is

partly intentional. Few operators want to be shown to be more expensive than their rivals so they design tariff options that are often not directly comparable. Nevertheless, tariff comparisons are useful to operators, users and regulators alike and, provided they are taken with a pinch of salt, they tell an important story. In the statistical annex to this report, tariff comparisons are presented for different countries. Figure 5.2 summarizes a range of charges levied by operators in different countries for making 100 minutes of mobile calls (half at peak rate, half off-peak), including a subscription charge where required, per month (see Box 5.1). Prices shown vary by a range of more than six to one. The picture would change slightly if one defines a different basket, for instance, taking into account an element of the initial connection charge or changing the number of calls, but the range between the cheapest and most expensive countries is still great. The average price levied for 100 minutes of

Box 5.1: Mobilephone usage

The mobile cellular tariff comparisons throughout this report are based on a basket of 100 outgoing minutes of use per month. This is done to enhance comparability and incorporate those tariff plans that include a certain amount of free minutes per month. The figure of 100 minutes per month is based on an analysis of mobile traffic usage worldwide (see Table). Monthly minutes of use is on the decline as more marginal users are added suggesting that the number of minutes to include in a basket-based approach to tariff comparisons will have to be carefully monitored. On the other hand, falling prices and growing use of mobile data services may reverse the decline. Subscribers in developing countries tend to use their mobilephones more than those in developed ones. An exception is Japan where mobile talk time is above the world average. This is partly attributed to greater business usage of mobilephones in that country.

Another aspect of the ITU tariff comparisons is a split between peak and off-peak times to account for different calling prices depending on the time of day or week when calls are made. ITU has used an even separation, allocating 50 minutes to peak times and 50 minutes to off-peak. There is scarce data on the actual breakdown of the number of mobile calls made during different periods of the day. OECD research suggests that, as would be expected, business users make most of their calls during peak hours (86 per cent of all business calls were found to be made during peak times). The ratio for residential users is more even (49 per cent peak, 51 per cent off-peak). Thus the ITU mobile tariff basket is more indicative of personal rather than professional use.

Box Table 5.1: Talking around the world

Average monthly minutes of use per mobile cellular subscriber, selected operators, 1996-98

<i>Country</i>	<i>Operator</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>
Australia	Telstra *	77	72	74
Brazil	Telesp	136	122	106
Japan	NTT DoCoMo *	123	115	125
Mexico	Telcel	115	100	96
Switzerland	Swisscom	107	94	86
Average		112	101	97

Note: The average is unweighted.

* indicates that the average minutes have been calculated based on the total annual number of minutes.

Source: ITU, adapted from company reports.

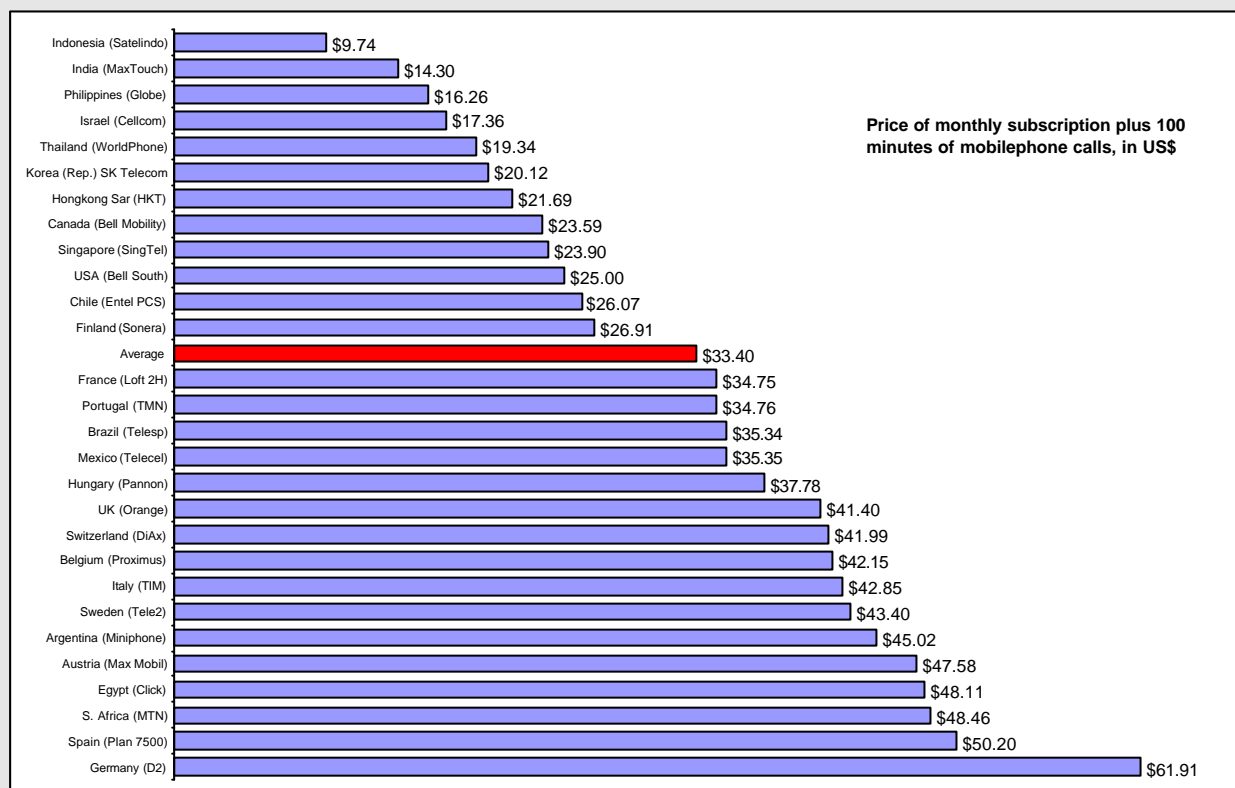
mobilephone use per month is US\$ 33.40, implying an average cost of just under 35 US cents per minute, including fixed charges. This unit cost would go down as usage increases.

Why is the range between high and low priced markets so wide? To some extent, the reasons are unrelated to mobile communications. The cheaper operators shown in Figure 5.2 tend to be in developing countries where the cost of living is much lower, or where there have been significant currency depreciations (for instance, in the case of

Indonesia). The corollary to this is that the more expensive operators tends to be found in countries that have a high standard of living, such as Germany. If the comparison were carried out in purchasing power parities (PPPs) rather than average annual US dollar exchange rates, then the positions might be different. With an adjustment for PPPs, the average revenue per user (ARPU) in 1997 was around US\$ 60 for developed countries and US\$ 94 for developing ones.² This suggests that mobile call tariffs are not as low in developing countries as they might appear.

Figure 5.2: Mirror, mirror on the call, who is the cheapest of them all?

Price of a monthly basket of 100 minutes of national mobilephone calls, including subscription, 50 minutes peak rate and 50 minutes off-peak, for a selection of major economies, August 1999, by mobile service operator/tariff plan, in US\$



Note: The tariff plan chosen for each operator is that which would provide the lowest price for the chosen basket of calls and monthly subscription. Tariff data is valid for August 1999. An average 1998 exchange rate for each country to US dollars is used.

Source: ITU World Telecommunication Indicators Database, Mobile PTO websites.

Nevertheless, going beyond the over-riding influence of macro-economic factors, there are some more significant messages hidden in the data:

- Several of the countries towards the more expensive end of the graph have introduced competition only recently (e.g., Egypt, Spain) while those at the low end of the chart have more competitive markets, exemplified by Hongkong SAR which awarded five digital cellular and five PCS licences during the 1990s in addition to the two analogue licences.³ Competition tends to provide a stimulus to lower prices.
- Similarly, there is a degree of correlation between those countries which have higher prices and those with a lower rate of mobile penetration than would be expected given their level of wealth, as measured by GDP per capita. As shown in Figure 5.3, of the economies in Western Europe, those with high tariff

levels, such as Austria or Germany tend to have a lower level of mobile density than might be predicted given the relative wealth of their citizens. On the other hand, countries with cheaper prices, such as Finland or Norway, tend to have higher mobile densities. Consequently, it can be concluded that higher prices stunt network growth.

- It is worth pointing out that some countries have relatively low local mobile tariffs—Canada and the United States for instance—but also have lower mobile densities than would be predicted given their level of wealth. One reason is that fixed-line charges often include free local calls in those countries, thus putting cellular at a disadvantage. Furthermore, in both countries the widespread practice of charging mobile users for incoming calls discourages cellular take-up. Finally, fragmentation of the cellular market in

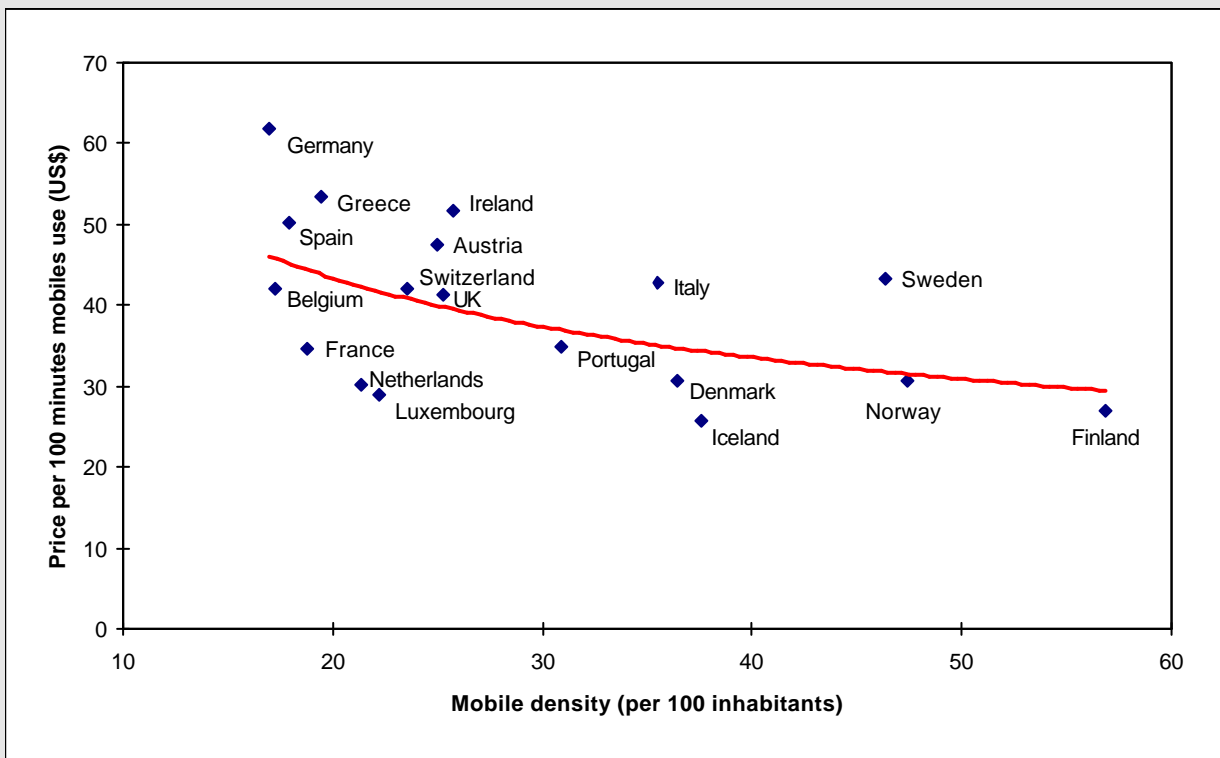
North America has meant that there are few nationwide mobile operators. Hence users that roam nationally typically pay an added surcharge, and domestic long-distance calls over mobilephones are typically more expensive than the equivalent fixed-line call. What this implies is that the level of mobile prices compared to fixed ones, and the structure of the cellular market, are both revealing indicators of mobile growth.

A further characteristic of the mobile tariff comparison (Figure 5.2) is that there are more specialist cellular companies in the top half (cheaper) of the chart whereas in the bottom half (more expensive) there are more mixed cellular/fixed-line companies. What this seems to suggest is that PTOs which have an installed base of fixed-line subscribers are less likely to engage in a low-priced tariff strategy, whereas specialist mobile companies have no such inhibitions. The reason the

former can get away with charging higher prices than competitors is that there is often a cost associated with switching operators. This suspicion is confirmed from an analysis of the top 20 mobilephone companies worldwide, ranked by 1998 subscribers (see Table 5.3). Those companies among the top 20 which are mobile specialists succeeded in growing their 1998 subscriber base at a much faster rate (52 per cent against 39 per cent) than did mixed cellular/fixed-line companies, while their revenue base grew at a similar rate (24.4 per cent against 21.7 per cent). Furthermore, the decline in average mobile revenue per user for specialist mobile companies between 1997 and 1998 was much faster (-17.9%) than for mixed cellular/fixed-line companies (-12.5%). In other words, specialist mobile companies appear to be following a more aggressive business strategy based on building market share through offering lower prices while mixed cellular/fixed-line companies appear to be more interested in profits and revenues than market share.

Figure 5.3: Mobile density and prices

Relationship between mobile teledensity (per 100 inhabitants, 1998) and wealth (GDP per capita, 1997), major economies



Note: The price is based on a basket of use including monthly subscription charge plus 50 minutes of peak-rate and 50 minutes off-peak use.
Source: ITU World Telecommunication Indicators Database.

5.3 Price trends

Are mobile prices getting cheaper? Certainly the popular perception is that the tariff plans being offered today are much cheaper than they were a few years ago, and the functionality offered on digital mobilephones is certainly higher than on analogue ones. This perception of lower prices is helping to

expand the market by attracting users who previously felt a mobilephone was beyond their means. But, in the same way that it is difficult to compare tariffs between countries and between operators because of the complexity of the options on offer, so it is difficult to track price trends because the options available, and the technology underlying them, keeps changing. To take but one example, the emergence of pre-paid

Table 5.3: Top 20 mobile operators worldwide, ranked by 1998 subscribers

Split between 100 per cent specialist mobile companies and other mixed cellular/fixed-line companies

Rank, Operator (Country)	Cellular subscribers (1)		Mobile telecom revenue (2)		
	Total (k)	Change 1997-98 (%)	Total (k)	Change 1997-98 (%)	% of total revenue
1 NTT DoCoMo (Japan) (3)	25'245	26.9%	26'163	18.7%	100.0%
2 China Telecom (China)	23'570	78.2%	7'956	40.8%	29.0%
3 TIM (Italy)	14'299	54.1%	7169	25.8%	100.0%
4 AirTouch (United States)	7'915	83.7%	4'028	12.4%	100.0%
5 AT&T (United States)	7'198	20.0%	5'406	15.8%	10.2%
6 SBC (United States)	6'851	24.7%	4'185	13.2%	14.5%
7 Bell Atlantic (United States)	6'623	19.6%	3'719	16.4%	12.0%
8 Omnitel (Italy)	6'190	151.6%	2'792	152.5%	100.0%
9 SK Telecom (Korea (Rep.))	5'966	30.5%	2'559	0.9%	100.0%
10 Mannesmann (Germany)	5'900	66.6%	4'371	30.6%	100.0%
11 Deutsche Telekom (Germany)	5'800	54.6%	3'586	20.3%	8.6%
12 DDI (Japan) (3)	5'604	11.9%	6'953	26.1%	77.9%
13 Vodafone (United Kingdom) (3)	5'570	63.8%	3'365	17.8%	100.0%
14 France Télécom (France)	5'450	81.7%	3'116	2.6%	11.0%
15 Telefónica (Spain)	4'894	53.6%	3'282	28.9%	16.1%
16 GTE (United States)	4'817	7.4%	3'070	5.1%	12.0%
17 BellSouth (United States)	4'796	14.4%	4'792	34.8%	20.7%
18 BT Cellnet (United Kingdom) (3)	4'522	47.0%	2'307	22.0%	8.3%
19 SFR (France)	4'201	90.5%	3'113	65.1%	100.0%
20 ALLTEL (United States)	4'009	13.8%	2'137	16.2%	41.0%
TOP 20	159'420	41.1%	104'069	22.9%	28.6%
<i>Of which:</i>					
100% cellular companies	75'286	51.6%	53'560	24.4%	100.0%
Mixed cellular/fixed companies	84'134	39.1%	50'509	21.7%	15.7%

Note: Figures in italics represent 1997 data and 1996/97 change.

(1) Equity-based domestic subscribers

(2) Domestic mobile revenue.

(3) Financial year beginning 1 April.

Source: ITU Public Telecommunication Operators Database, PTO annual reports.

options in the past few years has meant that the average price per call which is being paid has gone up. On the other hand, the overall cost of ownership of service for low volume users has come down.

In order to make meaningful price comparisons over time, it is useful to use a basket approach. This means that, instead of comparing the rates of individual calls, the price of a basket of calls of different duration, distance and made at different times of the day or week is compared, together with subscription charges and an element of the initial connection charge. The most reliable time-series data available for this type of analysis is the OECD tariff comparison model which defines baskets of calls for residential and business users. The actual number of calls included in the basket, which is dynamically defined according to the ratio between fixed and usage charges, varies over time, but the composition of the basket remains unchanged. It is necessary to make a few simplifying assumptions (for instance, the use of analogue rather than digital tariffs allows for a longer time series), but nevertheless by looking at the cost of ownership in terms of price per minute (including both fixed and usage charges) it is possible to track trends over time.

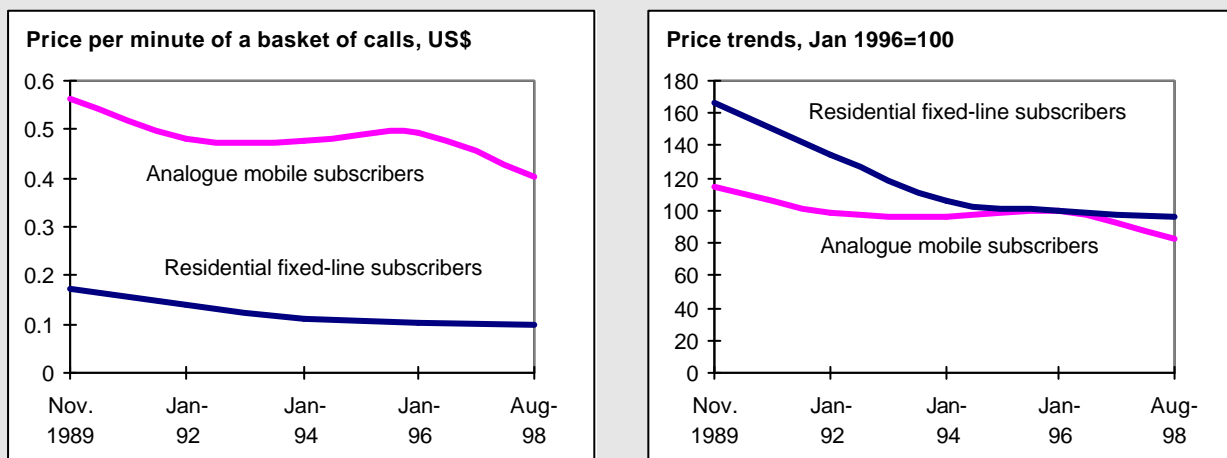
In November 1989, when OECD data collection began, the average price of mobilephones in the

24 OECD Member States at the time was around 56.4 US cents per minute (Figure 5.4, left chart). Ten years later this same basket had fallen in cost to just over 40 US cents per minute, a rate of decline of 3.7 per cent per year. During the same period the cost of ownership of fixed-line residential telephone service fell from 17.4 to 10.0 US cents per minute, a fall of some 6.1 per cent per year. The fact that the price of residential telephone service was, until recently, falling faster than mobile is due to a number of factors:

- The price of residential telephone service has been more closely regulated than mobile services with the use of “CPI-X” type price caps (where CPI = consumer price index, and X is a number relating to expected efficiency gains) in several OECD countries, ensuring that prices had to fall.
- The demand for mobile service in most OECD countries has been so great that service providers have not needed to reduce their rates in order to attract more customers.
- Technological change has been more rapid in the mobile world than the fixed-line one, meaning that many more features are available now, for a similar price, than a decade earlier.

Figure 5.4: Getting cheaper (but not by that much)

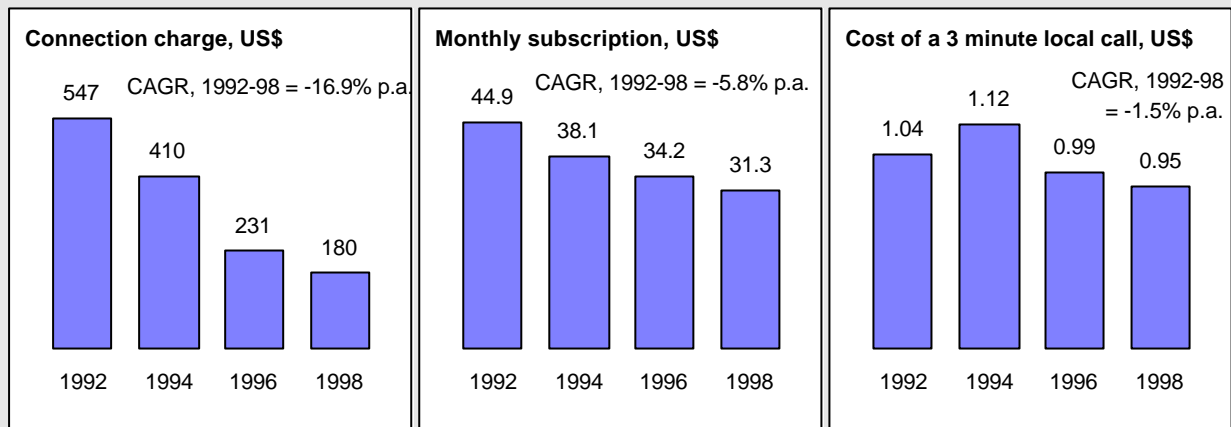
Trends in the average price per minute of the OECD residential basket, for fixed-line and mobile subscribers, measured in Purchasing Power Parities, November 1989 to August 1998, in US\$ (left) and indices, January 1996 = 100 (right)



Notes: The analysis of per minute prices is based on trends in a basket of calls, of different distance, duration and made at different times of the day/week, plus subscription charges and an element of the initial connection charge. The number of calls in each basket ranges between 600 and 1'200, depending on the balance between fixed and usage charges. For more information on the composition of the OECD tariff comparison model, see OECD (1990) "Performance Indicators for Public Telecommunication Operators", ICCP No. 22, Paris, 182pp, available from the OECD website at: <<http://www.oecd.org/dsti/sti/it/cm/prod/ICCP22.htm>>.

Source: ITU, adapted from OECD (1990) and from 1993-1999 editions of OECD *Communications Outlook*.

Figure 5.5: A lot cheaper to install, a bit cheaper to own, but not much cheaper to use
Trends in the connection, monthly subscription and three-minute local call charges, for an analogue mobile phone, global average, 1992, 1994, 1996 and 1998



Notes: The above charts are based on analysis of tariff data for 47 economies in 1992, 93 in 1995, 104 in 1996 and 105 in 1998. A simple unweighted average is used. Pre-paid subscriber packages are excluded from the analysis.
Source: ITU World Telecommunication Indicators Database.

- In some highly urbanized OECD countries with spectrum constraints, the price of analogue service has been raised relative to digital in order to encourage the user base to migrate towards more spectrum-efficient digital services. This might explain the apparent increase in mobile prices between 1994 and 1996.

Closer inspection of the data shows that, in the period up to 1996, fixed-line prices were falling at a faster rate than mobile whereas, in the period since 1996, the position has reversed and mobile is now falling faster (Figure 5.4, right chart). This may be due to the increase of competition in the OECD countries as additional companies were licenced to provide second-generation digital services.

For many consumers, especially in developing countries, it is the cost of connection and ownership of a mobilephone which is the main stumbling block to becoming a subscriber rather than the cost of making calls. Indeed, new subscribers are as likely to buy a mobilephone as much to be able to *receive* as to *make* calls, at least where calling party pays (CPP) is the norm. This reality is reflected in tariff trends. Using data from a wider range of countries than those included in the OECD tariff basket, analysis shows that whereas the average cost of making a three-minute local call via an analogue mobilephone has remained more or less constant

since 1992, hovering around the US\$1 mark, connection charges have come down to a third of their 1992 level and monthly subscription charges have also been falling by around 6 per cent per year (Figure 5.5).

For digital systems, fixed charges are usually lower than for analogue but in many cases usage charges are actually higher. However, it is difficult to generalize an overall tariff strategy among operators for the introduction of digital services. In the 54 countries for which both analogue and digital price data is available, prices are the same for each service in 15 countries, digital is more expensive in 10 countries, analogue is more expensive in 11 countries and in the rest there is a mix of higher or lower charges for connection, subscription and use. What this suggests is that there is no standard pricing model for the introduction of a new technology in an established market.

5.4 Mobile operator costs

The apparent confusion in the marketplace about how to price digital services relative to analogue ones is indicative of the fact that, in pricing mobile services, the underlying cost of provision is less important than issues of supply, demand and market structure. In the 1980s, mobile prices were high because supply was limited; in the early 1990s prices could still be

sustained because the high level of demand meant that suppliers did not need to cut prices in order to attract more customers. Only in the late 1990s has price cutting become an issue, and it is the licensing of additional companies, plus the proliferation of pre-paid schemes, which has focused attention on prices. But even now, there is only a tenuous relationship, at best, between prices and underlying costs. The significance of rapid technological advances in the mobile sector is that operators have been able to sustain healthy profit margins by reducing prices at a slower rate than the reduction in costs. It also means that mobile operators have been willing to pay relatively high prices—for instance in the form of licence fees, bids in spectrum auctions, or acquisitions of other mobile companies—in order to gain market entry.

In order to understand the economics of mobile communications operations, it is helpful to look at those operators which offer only mobile services rather than those which also offer fixed-line services. This is necessary in order to disentangle costs common to both mobile and fixed-line networks, such as marketing, billing or customer service. In theory, the start-up costs of a mobile network should be much lower than for fixed-line because there is no necessity to create a direct path to the subscriber which, for a fixed-line network, usually means digging up the road. Furthermore, in a mobile network, more of the network intelligence is embedded in the handset, which is an investment decision made by the customer, rather than in the network provided by the operator.⁴ However, these theoretical cost advantages are negated to some extent by the fact that mobile networks, in developed countries at least, are usually much more recent than fixed-line ones. That means that much of the local loop costs of a fixed-line network were paid off decades ago, whereas much of the mobile network infrastructure has been invested within the past few years. A second factor to consider is that the costs of acquiring and retaining customers tend to be higher for mobile networks because the market is more competitive and customers switch between operators more easily (see Box 5.2).

For mobile operators, a critical indicator is average revenue per user, which is usually abbreviated as ARPU. For many operators, ARPU is declining over time (see Figure 5.6, left chart). This is a result of two principal factors:

- Price cutting in competitive markets. For example, Bell Mobility of Canada competes against three

other operators while SK Telecom of the Republic of Korea is in competition with four others. Bell Mobility's price per minute has fallen from a peak of 60 US cents per minute in 1993 to 37 cents in 1998.

- Growth in the number of subscribers. While ARPU may well be increasing among existing subscribers, the lower usage patterns of marginal newer subscribers is sufficient to drag down the overall level of ARPU. For Bell Mobility, for instance, the average level of use fell from 204 minutes per month in 1990 to 143 minutes in 1995, though it has subsequently risen again to 163 minutes.

The decline in ARPU is partially offset by a declining level of costs per subscriber. SK Telecom's unit costs have declined since 1996 while Bell Mobility's costs have been declining since 1994. Economies of scale are a significant element in this declining cost structure. As the total number of subscribers increases, the marginal operating cost per subscriber of functions such as transmission, switching, acquisition of cell sites and billing, will fall. This is well illustrated in the case of Bell Mobility. Between 1990 and 1998, Bell Mobility's operating costs per subscriber fell from US\$37 per month to around US\$19 per month. On the other hand, as the level of market competition increases, so the costs of acquiring and retaining customers increases (see Box 5.2).

For mobile operators as a whole, there has been a convergence over time between the average spending of fixed-line and mobile users (Figure 5.7, left chart). This is well-illustrated in the case of Japan where, in 1990, the average mobile user was spending three times more per year than the average fixed-line subscriber. By 1997, mobile users were still spending more, but only by 20 per cent. The convergence was caused by mobile spending falling rather than fixed-line spending rising. The reason for this is that cheaper mobile services combined with much higher market penetration bring many new, more marginal, users onto the mobile network.

Other cost elements, which have tended to rise over time, are non-operational costs. These include items such as licence payments, spectrum fees, taxes, etc. As governments have realized the revenue-earning potential of mobile communications, they have tended to add extra financial burdens onto the sector, especially in the form of licence fees. These are inevitably passed on to the consumer.

Box 5.2: Churn: a critical factor affecting profitability

The turnover of customer subscriptions during a specific period of time, as a percentage of the installed base, is referred to as “churn”. Traditionally, churn was measured over the course of a year, but as rates of churn have risen and become more variable over time, it is now more common to measure churn rates on a monthly basis.

Churn is a particularly critical factor in the mobile sector. This is partly because the barriers that prevent a customer from changing between operators are particularly low in the mobile industry, especially where customers are on pre-paid tariff schemes with low fixed costs, and also where mobile number portability has been implemented. In Hongkong SAR, for instance, some 200'000 mobile users changed their suppliers in the three months following implementation of mobile number portability. However, the high level of churn in the mobile sector is also due to the generally higher level of competition which exists, compared with the fixed-line sector. Furthermore, when a fixed-line subscriber in a competitive market wants to take advantage of lower prices, it is usually only necessary to “dial around” to take advantage of the lower rates offered by resellers. By contrast, as the reseller market is not well-developed for mobile communications in most countries, getting the best deal usually involves renouncing one subscription and taking up another.

The paradoxical consequence of high churn rates (which are caused in part by users shopping around to get lower prices) is that the costs of mobile operators tend to go up, because they are forced to spend more money on advertising and on administration of connections/disconnections. These higher costs are inevitably passed on to subscribers in terms of higher prices. For instance,

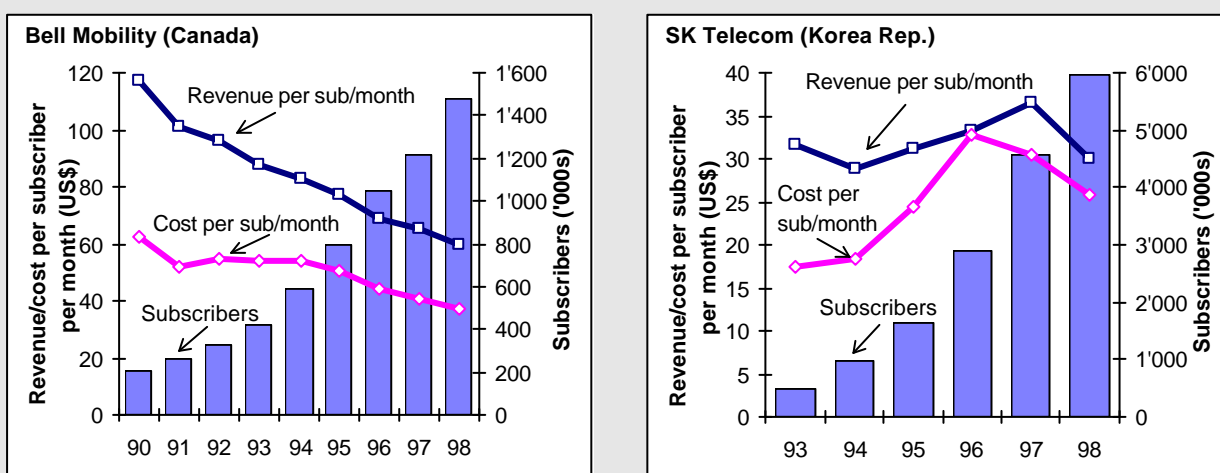
Bell Mobility reports that, between 1990 and 1998, the costs of acquiring and retaining customers rose from US\$426 per net addition to US\$637. A quarter of NTT DoCoMo’s costs go towards incentive schemes and other marketing costs compared with just 19 per cent which goes on investment in the network. It is all too easy for a mobile operator to get stuck in a spiral of higher rates of churn, leading to higher prices, leading in turn to higher rates of churn.

What can be done to reduce churn? The simple answer is to offer lower prices and better quality of service than anyone else in the market. But even that is sometimes insufficient to counteract a determined advertising campaign from a competitor. Strong brand names help in retaining customers, and this can sometimes work to the advantage of incumbent fixed-line operators who have a reputation for solidity and reliability. In Japan, NTT DoCoMo’s monthly churn rate is around 1.7 per cent compared with an industry average of 3-4 per cent. A primary motivation for churn is the search for lower prices while an important secondary factor is handset price and associated features such as weight, battery life, etc. In order to entice customers to switch, a growing number of mobile operators subsidize handsets.

While churn is a nuisance for any operator, taking a positive attitude can provide benefits. For instance, talking with subscribers who are giving up your service for that of a competitor is more valuable than any number of focus groups in teaching an operator about its own strengths and weaknesses. Furthermore, churn can sometimes be a way of getting rid of more marginal, non-creditworthy customers, or persuading subscribers with an analogue subscription or an older handset to upgrade. Ultimately, churn is a fact of life in a competitive marketplace. So it is better to learn to love it than to try to ignore it!

Figure 5.6: Growing markets, but lower-spending subscribers

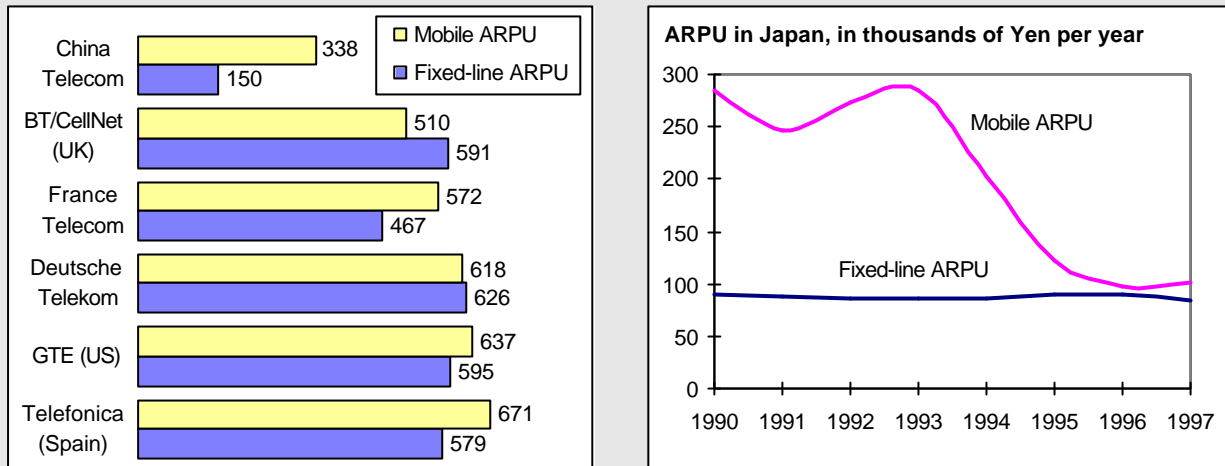
Subscribers, cellular revenue and costs per subscriber per month, for Bell Mobility, 1990-98, and SK Telecom, 1994-98



Note: Where possible, revenue and costs from non-cellular operations (e.g., paging) has been excluded. Revenue per subscriber per month includes revenue from interconnection, for instance on incoming calls. Costs cover principally operating costs and exclude tax.
Source: PTO annual reports and websites: <<http://www.bellmobility.com>> and <<http://www.sktelecom.com>>.

Figure 5.7: Converging revenues

Average revenue per user (ARPU) per year for mobile and fixed subscribers, for selected operators, 1998, in US \$, and in Japan, 1990-97, in thousands of Yen



Note: The figures for Japan in the right chart cover all the operators in the market. Mobile includes PHS subscribers and revenues. The average annual exchange rate for 1997 was US\$ 1 = 121 Yen.

Source: ITU World Telecommunication Indicators Database and Public Telecommunication Operators Database.

5.5 Interconnect tariffs

Probably the most significant costs that a mobile operator faces are interconnection fees. In markets where the fixed-line network is well-established, the majority of calls to mobiles will originate on the fixed-line network and, equally, the majority of calls from mobiles will go to the fixed-line network. Thus the interconnect arrangements between mobile and fixed-line can make or break the business plan of a new mobile operator.

But, equally, interconnect payments can contribute greatly to the profitability of a mobile operator, especially where the rates charged by the mobile operator for terminating calls are above cost and calling party pays (CPP) is in operation. In the United Kingdom, for instance, calls from fixed-line subscribers to mobiles comprise only 2 per cent of total calls from fixed-line subscribers but they amount to some 9 per cent of the value of the market.⁵ Indeed, the high prices charged in the United Kingdom for calls to and from mobiles were brought by the regulator to the attention of the Competition Commission (formerly the Monopolies and Mergers Commission). The Commission ruled that the prices charged by the mobile operators for terminating calls were excessive and that they should be brought into line with costs, allowing for a reasonable return on capital (which it defined as 16.5 per cent). It was

concluded that current prices for call termination on mobiles should be reduced by 9 per cent in both 1999 and 2000 to reach a benchmark level of 10.3 pence (16.6 US cents) per minute. Furthermore, the mobile operators were ordered to stop charging for unanswered calls which terminated to recorded messages, and for the period during which a call was being diverted.⁶

With regard to the fixed-line network, the Competition Commission noted that BT's profit margin (its "retention") on calls to mobilephones was some 150 per cent higher than for local calls on the fixed-line network. It ruled that BT should reduce its profit margin from the current level of 5.8 pence (9.3 US cents) per minute to 2.9 pence (4.7 US cents) by 2001/2. In the wider context of Europe, the European Union Competition Policy Directorate (DG IV) is also carrying out a review of mobile/fixed-line call prices. In many cases, the mobile interconnect tariff charged by fixed-line operators is the same as for calls coming from competing fixed-line networks, but this is not always the case, raising the issue of discrimination. There is little rationale for any price difference once the call arrives onto a network.

In India, the topic of interconnection between mobile and fixed operators has also come to the attention of the regulator. As from 1 May 1999, a revenue-

sharing agreement has been put into place whereby, for domestic long-distance calls, revenue would be shared on a 60:40 basis between the origin and transit provider and 45:55 for international calls, but that the terminating service provider would not gain from the revenue sharing. This corresponds roughly to Rs. 0.48 (1.1 US cents) for a domestic long distance call and Rs. 0.66 (1.6 US cents) for an international call.⁷ An added complication is that the regulator has also proposed that some 15 per cent of the revenue raised by mobile operators should be shared with the government-owned fixed-line operator (the Department of Telecommunications) in lieu of licence payments, on which many of the operators had defaulted, as from 1 August 1999.

In several other developing countries, such as Samoa or Lesotho, a sender-keeps-all arrangement exists between the fixed-line operations of the incumbent and the mobile operator. This may be because the incumbent owns a share of the mobile operator, or because no technology exists to measure interconnect traffic, or because insufficient expertise exists to negotiate an interconnect agreement. Sender-keeps-all tends to benefit the mobile operator, especially in the early years of operation when a majority of traffic terminates on the fixed-line network. Furthermore, given the differences in price which exists between calls made on fixed and mobile networks, a sender-keeps-all arrangement obviously benefits the higher-priced mobile operator.

5.6 Price convergence

For the moment, the price of ownership and usage of mobilephones is considerably higher than for the fixed-line network. But looking ahead, it is likely that the gap will narrow over time:

- At present, a high percentage of calls originating on mobile networks terminate on fixed-line networks. As the user base of mobile subscribers grows, a higher percentage of calls will remain on the same mobile network, thereby obviating the need for an interconnect payment. Figure 5.8 illustrates this point. In 1992, only 5.8 per cent of calls in Japan which originated or terminated on a mobile network actually stayed on that network. By 1997, almost one-third of mobile calls completely by-passed the fixed-line network.
- Most mobile operators around the world are relatively recent in origin, and their digital networks

are generally less than five years old and still growing at a fast rate. Consequently, the investment has not yet been amortized. Over time, as the market matures, the capital requirements for mobile operators should be reduced and their asset base (for instance, high sites which can be re-used in new networks and shared, if necessary with competitors) will grow. This should also serve to reduce their cost base.

- At present, in a buoyant market, mobile operators do not have to try too hard to gain new customers. Furthermore, the majority of their revenues comes from a relatively small proportion of their subscriber base, meaning that there is not always as much incentive to go after new, more marginal customers, as to sell more intensively to their existing customer base. In Canada, for instance, some 14 per cent of customers generate 53 per cent of average monthly revenue, and this experience is not unusual (see Figure 5.9). However, as the level of penetration increases, and market saturation approaches, price-cutting should become more prevalent in order to capture more marginal users.

The point at which price convergence between fixed and mobile networks is reached will vary between countries. It will depend not so much on the overall level of economic development of a country, but rather on the relative development of fixed and mobile networks. Price convergence may come as quickly in a developing country where the mobile network has grown rapidly as a substitute for the fixed-line network (Thailand, for instance) as in a developed country where the mobile network was originally a supplement to the fixed-line network but where growth has continued (Finland, for instance). Table 5.4 illustrates the case of Finland, which has one of the most mature mobile markets. In 1998, some 29 per cent of total calls, and 55 per cent of call revenue, originated on mobilephones. These percentages are growing rapidly. In many cases, calls between mobile subscribers on the same network are already cheaper than fixed-line calls, especially for longer distances.

When price convergence is reached, it will have major implications for both the fixed-line and the mobile network. The example of Finland is an instructive one because it shows how substitution is occurring:

- The first level of substitution is of **calls**. Subscribers will make calls from a mobilephone that they would otherwise have made from a fixed-line telephone. In Finland, this seems to be distinctly distance-

Table 5.4: Where do the calls come from, where does the money go?*Breakdown of call origin, duration and revenue, Finland 1996-98*

Origin	% of call revenue		% of call time		% of number of calls		Average duration of calls (minutes)	
	1996	1998	1996	1998	1996	1998	1996	1998
Local calls	40	33	76	71	72	62	3.8	4.2
Long-distance calls	6	3	13	10	10	7	4.9	4.9
International calls	14	9	2	2	2	2	3.6	3.6
Mobile calls	40	55	9	17	16	29	2.0	2.1
Total/average	100	100	100	100	100	100	3.6	3.6

Note: Averages are weighted.

Source: Ministry of Transport and Communications, Finland "Telecommunications Statistics".

sensitive in its effect, probably because the fixed-line network still had, until recently, distance-based tariffs, unlike mobile networks. Thus, the number of long-distance fixed-line calls made in Finland peaked in 1991. Since then they have declined by 29 per cent. By contrast, over the same period, local calls grew by 12 per cent (though they declined in 1998) and international calls grew by 56 per cent. Digital (GSM) mobilephone calls have increased fourfold just since 1995. Insofar as calls made on mobile networks have been substituting for calls that would otherwise have been made over the fixed-line network (and are not just additional calls) they appear to have been replacing long-distance national calls, though not to the same extent for local or international calls.

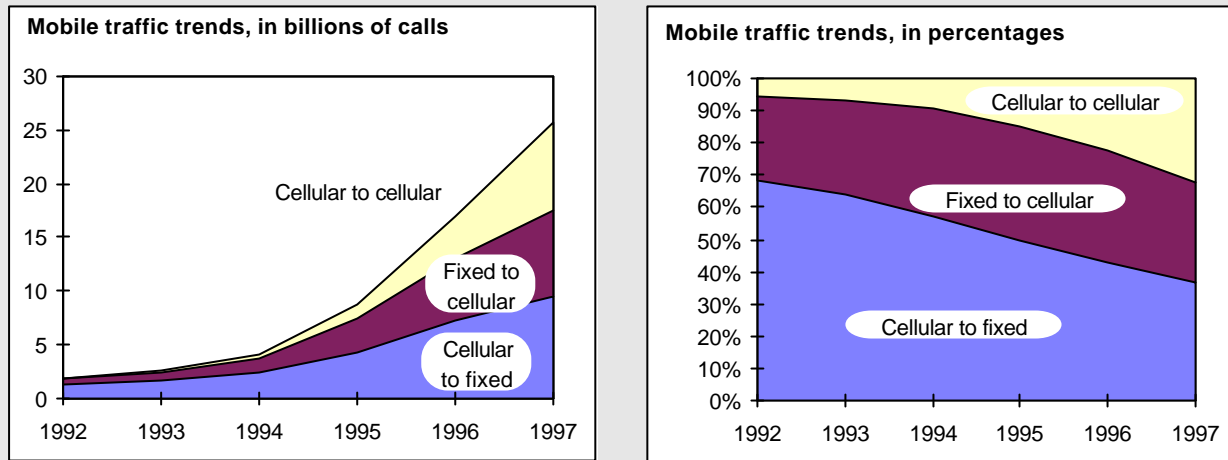
- The second level of substitution is of **revenue**. This is occurring at two levels: loss of actual revenue from fixed-line networks and, more importantly, loss of potential revenue. In Finland, revenue from voice-based fixed-line networks constituted only 29 per cent of 1998 telecommunication revenue.⁸ This percentage is likely to decline further, particularly due to the erosion of long-distance and international call charges.
- The third level of substitution is at the level of **subscribers**. In rich economies like Finland, most subscribers are wealthy enough to have both a fixed-line telephone and a mobilephone if they wish, though almost one-fifth of Finnish

households now have only a mobile. Fixed-line connections are nevertheless still growing due to high demand for Internet connections. Whereas the number of standard fixed-lines in Finland actually declined by 6'000 or 0.2 per cent in 1998, this was more than compensated for by the increase in ISDN connections (the number of B-channel equivalents) which grew by more than 70'000, or 43.7 per cent. But in poorer economies with long waiting lists for fixed-line connection, new subscribers, particularly younger ones, are actually choosing a mobilephone in preference to a fixed-line one. For young adults who are buying a telephone for the first time, a mobilephone may be more in keeping with their lifestyle. Thus when the opportunity comes to acquire a fixed-line telephone, they may find they no longer need one.

This phenomenon of choosing mobilephones in preference to fixed-line ones is particularly acute in developing Asia-Pacific economies with a dynamic, predominantly young population, and an urban lifestyle. As Figure 5.10 illustrates, ownership of mobilephones remains more expensive than fixed-line telephones in these economies. Even in Cambodia, where the cost of ownership (monthly subscription) is only marginally higher for a mobilephone, the cost of usage (as approximated by the cost of a three minute local call) is almost seven times higher. Nevertheless, this price differential does not appear to have slowed the take-up of mobilephones. In Cambodia,

Figure 5.8: Bypassing the fixed-network

The evolution of call traffic trends in Japan, 1992-97



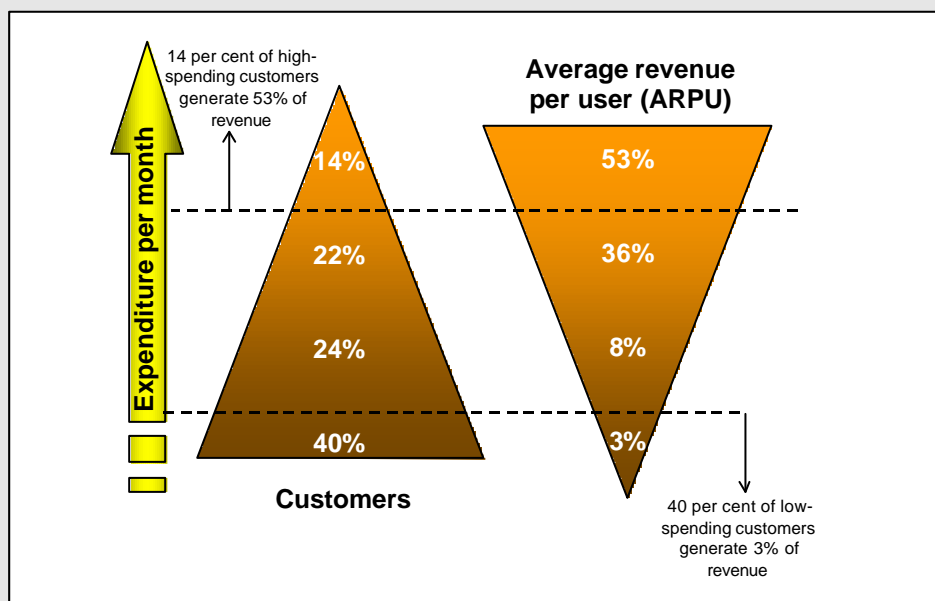
Note: Calls between cellular and PHS networks are included in cellular to cellular. Figures exclude calls from fixed-to-fixed subscribers.
Source: Ministry of Posts and Telecommunications, Japan.

mobilephones already exceed the number of fixed-line telephones. At current rates of growth, the cross-over will occur in Hongkong SAR during 1999, in Malaysia and Sri Lanka in 2001, in Indonesia in 2002 and in Thailand in 2008.

Once mobilephone users exceed fixed-line subscribers, the implications for a country's telecommunications sector are enormous, especially for pricing. In a sense, this is still unexplored territory though several countries such

Figure 5.9: Cultivate the high-spenders

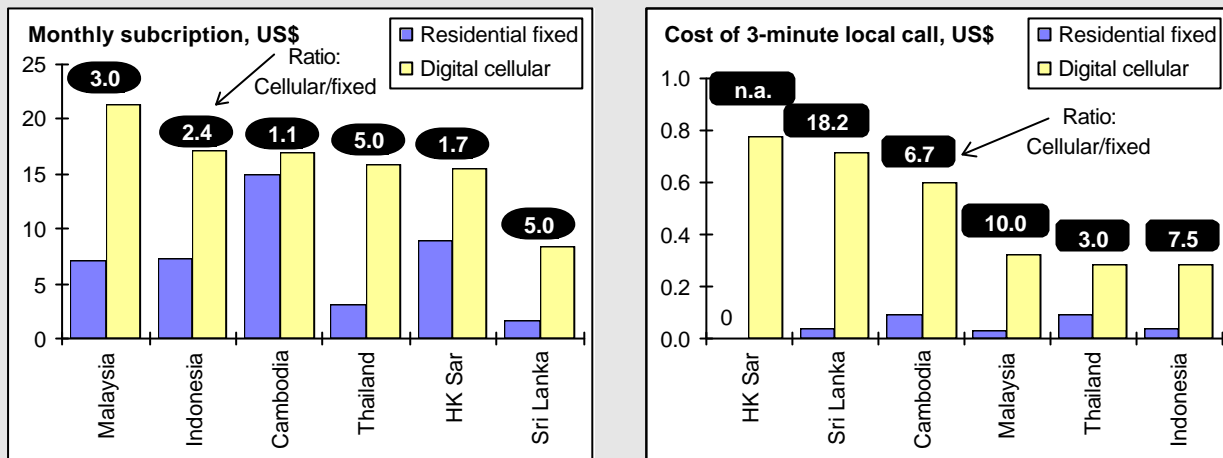
Breakdown, by quartile, of average revenue per user, for mobile users in Canada



Source: Extracted from Derek Burney, Bell Canada Int'l, presentation made at CT Telecom and Securities Conference, Toronto, 2 June 1999, available at: <http://www.bci.ca/bci/e/headoffice/communications/speeches/1999.06.02/show/>. Based on research by PriceWaterhouseCoopers.

Figure 5.10: Relative prices

Cost of ownership and usage for mobilephones and fixed-line telephones, in selected developing Asia-Pacific economies, 1997



Source: ITU World Telecommunication Indicators Database.

as Cambodia and Finland have already passed the cross-over point (see chapter six). A majority of calls will go from one mobilephone to another, in many cases by-passing the fixed-line network altogether. Thus the interconnect premium, discussed above, will either not be relevant or will take the form of an interconnect between mobile networks. Calls to other mobilephones should be cheaper than to fixed-line telephones and may even be cheaper than long-distance calls between fixed line telephones.

Furthermore, once a critical mass of mobilephones exists, it becomes possible to develop new services which would not previously have held much appeal. Drawing again upon the example of the Nordic countries, the development of Short Message Service (SMS) data applications has taken-off to an extent which could not have been predicted, and SMS now contributes around 20 per cent of total mobile revenues in these markets. On the fixed-line telephone network, where screenphones are still scarce, there is no direct equivalent to SMS. In the longer term, the broadband transmission rates available with third-generation mobilephones (IMT-2000) should enable many more value-added services to develop. Perhaps the most intriguing is the possible development of video-based mobile telephony. On the fixed-line network, video-telephony was often predicted as the wave of the future but never really

took off due to a combination of user wariness, lack of installed base of screenphones, limited bandwidth and lack of appropriate data compression software. But if mobile handsets with larger screens become a standard feature on 3G mobile networks, the 'chicken and egg' type problem which has dogged the development of video-telephony (what comes first, the screenphone or the video-call?) might finally be resolved.

Of course, fixed-line networks are not dead yet. However, in order to find areas where they still hold a comparative advantage over mobile networks, their tariff structures will need to change. The average holding time for calls made over the fixed-line network in a country such as Finland (around 4 minutes 15 seconds) is much longer than for mobilephones (2 minutes 6 seconds). This is likely to increase as the volume of fixed-line traffic which is destined for connection to the Internet increases. The future for fixed-line operators lies in moving away from per-minute based, distance-sensitive pricing towards Internet-oriented pricing structures that are distance-insensitive and which move towards duration insensitivity after a certain number of minutes of use. It is likely that, in the future, fixed-network operators will gain a higher share of their income from fixed charges (connection and monthly subscription) whereas the clear trend is for mobile operators to gain a lower share from fixed charges

(viz. the popularity of pre-paid) and a correspondingly higher share from usage charges.

For developing countries, the cross-over from fixed-line to mobile may well be more decisive because, where the fixed-line network is not well developed, future third-generation mobile systems could well become the main conduit for Internet traffic as well as for voice. Furthermore, the evidence examined here points to the fact that mobile operators are still charging prices which are well-above costs for their services, even in developing countries. Once mobile operators turn their attention to reaching a mass market, by lowering their prices, and once fixed-line operators have rebalanced their tariffs, by eliminating the current subsidies to access charges and local call

prices, then it may be that mobile prices turn out to be *lower* than fixed-line ones for comparable services.

To conclude this chapter, it is worth returning to where we started: **Options**. The responsibility for the packaging and pricing of mobile services in most countries is now out of the hands of those who designed and built the service and in the hands of those who must sell it. Marketing mobile services means listening to customers, understanding the segmentation of the market, and following closely the moves of competitors. The best way to do that is to discriminate between ever more narrow groups of customers and to develop multiple pricing options which address their needs. Ultimately, what the customer wants, the customer gets.

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- ¹ To be more accurate, and to go beyond the narrow point being made here, mobile service can sometimes be cheaper than fixed-line service for certain calls, and for certain services (e.g., connection) in a few countries. These examples are discussed later in this chapter. But the basic point is still true.
- ² See Morgan Stanley Dean Witter (1999), “Japan Investment Research: NTT DoCoMo”.
- ³ There has been a degree of consolidation in the Hongkong SAR market, as well as overlapping digital cellular and PCS licences, but there are still six companies offering mobile cellular service.
- ⁴ This cost advantage is partly negated in countries where mobile operators subsidize handsets.
- ⁵ These statistics are from OFTEL Market Study, valid for mid-1998, and are quoted in Ovum (1999) “Tariff transparency in a multi-operator environment”, available at: <http://www.ispo.cec.be/infosoc/telecompolicy/en/V2study.pdf>
- ⁶ The two reports are available from the UK Competition Commission’s website at: <http://www.mmc.gov.uk/9798.htm#1999>.
- ⁷ The Indian regulator, TRAI, published its regulation on Interconnection on 28 May 1999. It is available from the website at: <http://www.trai.gov.in/interregu.html>.
- ⁸ Mobile accounts for 36 per cent while other activities (e.g., Internet, equipment rentals, etc.) account for 35 per cent of 1998 Finnish telecommunication revenues. See Ministry of Transport and Communications (Finland) (1999), *Telecommunication Statistics 1999*.